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| FORM PTO-1390 (REV 11-98) | | U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE | | ATTORNEY'S DOCKET NUMBER | |
| TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371 | | | | DEM-1 | |
| | | | | U.S. APPLICATION NO. (If known, see 37 CFR 1.5) | |
| INTERNATIONAL APPLICATION NO. PCT/FR99/00297 | | INTERNATIONAL FILING DATE 11 FEB. 1999 (11.02.99) | | PRIORITY DATE CLAIMED 26 MAR. 1998 (26.03.98) | |
| TITLE OF INVENTION COMPOSITIONS FOR IMPROVING CROP PRODUCTION, THE QUALITY AND PROTECTION THEREOF | | | | | |
| APPLICANT(S) FOR DO/EO/US MORELLE, Jean; LAUZANNE, Eliane; DE MIL, Christophe | | | | | |
| Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: | | | | | |
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). | | | | | |
| Items 11. to 16. below concern document(s) or information included: | | | | | |
| <ol style="list-style-type: none"> 11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: Statement Claiming Small Entity Status | | | | | |

25 JAN 2000

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| U.S. APPLICATION NO. (if known, see 37 CFR 1.51) 09/463536 | | INTERNATIONAL APPLICATION NO. PCT/FR99/00297 | | ATTORNEY'S DOCKET NUMBER DEM-1 | |
| 17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. \$970.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00 ENTER APPROPRIATE BASIC FEE AMOUNT = | | | | CALCULATIONS PTO USE ONLY | |
| | | | | | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | | | \$ | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | | |
| Total claims | - 20 = | | X \$18.00 | \$ | |
| Independent claims | - 3 = | | X \$78.00 | \$ | |
| MULTIPLE DEPENDENT CLAIM(S) (if applicable) | | | + \$260.00 | \$ 260.00 | |
| TOTAL OF ABOVE CALCULATIONS = | | | | \$ 1100.00 | |
| Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28). | | | | \$ 550.00 | |
| SUBTOTAL = | | | | \$ 550.00 | |
| Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | | | \$ | |
| TOTAL NATIONAL FEE = | | | | \$ 550.00 | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property | | | | \$ | |
| TOTAL FEES ENCLOSED = | | | | \$ 550.00 | |
| | | | | Amount to be: refunded | \$ |
| | | | | charged | \$ |
| a. <input checked="" type="checkbox"/> A check in the amount of \$ 550.00 to cover the above fees is enclosed. | | | | | |
| b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. | | | | | |
| c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 05-1675 . A duplicate copy of this sheet is enclosed. | | | | | |
| NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status. | | | | | |
| SEND ALL CORRESPONDENCE TO: David L. Just LUCAS & JUST 60 East 42nd Street New York, NY 10165 Tel: (212) 682-4980 Fax: (212) 573-6127 | | | | | |
| | | | | SIGNATURE:  _____ David L. Just NAME _____ 25,687 REGISTRATION NUMBER | |

**STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.8(f) & 1.27(b))--INDEPENDENT INVENTOR**

Docket Number (Optional)
DEM-1

Applicant, Patentee, or Identifier: Jean Morelle et al.

Application or Patent No.: PCT/FR99/00297

Filed or issued: February 11, 1999

Title: COMPOSITIONS FOR IMPROVING CROP PRODUCTION, THE QUALITY AND
PRODUCTION THEREOF

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.8(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☐ the specification filed herewith with title as listed above.
☒ the application identified above.
☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.8(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.8(d) or a nonprofit organization under 37 CFR 1.8(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ No such person, concern, or organization exists.
☐ Each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the cost of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

Jean MORELLE
NAME OF INVENTOR
[Signature]
Signature of Inventor

24 JANVIER 2000
Date

Eliane LAUZANNE
NAME OF INVENTOR
[Signature]
Signature of Inventor

24 JANVIER 2000
Date

Christophe DE MIL
NAME OF INVENTOR
[Signature]
Signature of Inventor

24 JANVIER 2000
Date

006180-9929700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the matter of:

Applicant: Jean MORELLE et al.

U.S. Serial No. 09/463,536

International Application No. PCT/FR99/00297

International Filing Date: 11 February 1999

Title: COMPOSITIONS FOR IMPROVING CROP PRODUCTION,
THE QUALITY AND PROTECTION THEREOF

60 East 42nd Street
New York, NY 10165
August 18, 2000

BOX PCT
Asst. Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Please amend the application as follows:

In the Claims:

Please cancel claims 1-7 and substitute therefor the
following new claims:

8. A method for increasing crop yields of agricultural products and for protecting crops and plants against viruses, microorganisms and destructive animals, said method comprising administration to said crops of an effective amount of one or more compounds including lipo-amino acids in which activity is linked to hydrosolubility, said lipo-amino acids being either salified or non-salified by oligoelements.

9. The method according to claim 8 wherein the oligoelements are selected from the group consisting of copper and zinc.

10. The method according to claim 8 wherein said compounds are characterized by chains of fatty acids having four to eight carbon atoms acylated to amino acids derived from hydrolysates selected from the group consisting of animal proteins, fish proteins, and vegetable-based proteins.

11. The method of claims 10 wherein the fatty acids are selected from the group consisting of butyric and caprylic.

12. The method of claim 10 wherein the said compounds are zinc salts of butyric-amino acids administered in an amount effective to repel animals harmful to said crops.

13. The method of claim 10 wherein the said compounds are zinc salts of butyric-amino acids administered in an amount

effective to increase crop germination and root development.

14. The method of claim 10 wherein said compounds are copper salts of caprylic amino acids administered in an amount effective to protect crops and leaves against viruses and microorganisms.

15. The method of claim 10 wherein said compounds are copper salts of caprylic amino acids administered in an amount effective to increase the sugar content of beet crops.

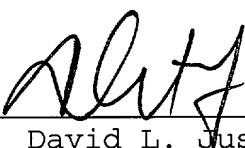
16. The method of claim 10 wherein said compounds are copper salts of caprylic amino acids administered in an amount effective to increase the sugar content of grape crops.

REMARKS

Applicants have filed simultaneously herewith an English translation of the above-identified International Application. The claims have been amended herein so as put them into proper U.S. format and to use idiomatic English.

Respectfully submitted,

LUCAS & JUST

By 
David L. Just
Registration No. 25,687

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COMPOUNDS INTENDED TO IMPROVE CROP
PRODUCTION, QUALITY AND PROTECTION

French Patent Number 77 27703 is intended to protect the use of a certain number of lipo-amino acid structures/compounds for agricultural purposes, research having demonstrated their general activity on chlorophyllous function. There were no teachings
5 provided concerning the nature of the compounds used, the nature of the plants or the conditions which would maximize crop yields. Consequently, it has been noted that several other variables which can impact results positively or negatively need to be taken into consideration.

In effect, twenty years of research has led to the discovery
10 that the compounds indicated in this patent do not, in and of themselves, guarantee favorable results without taking into account numerous other parameters: the nature of the molecule, concentrations of the molecules per hectare, the moment of
15 application based upon the life cycle of the plant in question, its nature, the state of the soil and climactic conditions.

Thus, in light of several experiments performed in the field we have reached the surprising conclusion that certain lipo-amino acid elements as opposed to others, salified or not by
20 oligoelements such as copper and zinc, had an efficacy comparable

to plant hormones (auxins) given the low quantity needed per hectare: a dose of 6g./hectare, in an anhydrous compound, is sufficient for obtaining positive results in certain crop types.

These observations show us that the application of the compounds indicated in various patents will require further study in order to obtain the desired results.

It has been ascertained that the activity was linked to the hydrosolubility of the compound, which is found in the butyric chain and the caprylic chain but not in the other fatty acid chains.

It has been surprising to observe that the zinc salts of the butyric-amino acids also protected crops by repelling animals destructive to them, such as birds, rabbits, wild boar, etc.

Additionally, this structure increases the germinal capacities as well as root development, contrary to copper salts or the zinc salts of caprylic-amino acids.

Only a few grams of zinc salts (between 5 and 10 grams) of butyric-amino acids for 100 to 150 kilograms of crops are required in order to obtain the specified activity.

Only 0.036 to 0.36 mol. of copper salts of caprylic-amino acids are necessary to increase the sugar content of beets and grapes by 5 to 10%. Beyond the ordinary doses, one exceeds

optimal efficacy without any detrimental effects to the plant.

Only 0.1 mol of copper salts of butyric-amino acids are necessary in order to obtain a 5 to 10% increase in crop yields of legumes (peas, green beans).

5 In the case of potato cultivation, if one treats the crop with two times 50 g. of copper salts of butyric-amino acids (0.2 mol/hectare) at the end of the tuberisation phase, one obtains an increase in crop yield of 4 metric tons per hectare. These results are a measurable improvement over those obtained with
10 copper salts of caprylic-amino acids.

Other benefits observed are more uniform tubers, of a higher caliber and a general increase in the quality of crop yield. However, if the treatment is applied during the tuberisation
15 phase, the development cycle will be disturbed and the results alluded to earlier will not be obtained.

As far as cereals are concerned, it has been determined that it is preferable to use the caprylic chain salified by copper, treating either during ear emergence or during flowering,
20 specifically several treatments in the dosage of 6 g./hectare (0.01 mol) or one treatment of 60 g. (0.1 mol).

Finally, it has been concluded that the zinc and copper salts of the butyric-amino acids proved detrimental to the flower

and it is therefore imperative to use the product in a non-salified form in a dose of 60-100 g./hectare.

Thus, in the case of this patent, we have determined that it is preferable to use chains of fatty acids with four to eight
5 atoms of carbon, specifically the butyric chain and the caprylic chain, acylated to the amino acids derived from hydrolysates of animal proteins, including those derived from fish, as well as vegetable-based ones.

It has also been observed that the final activity of the acylates was dependent upon the nature of the fatty acid chain
10 and the nature of the oligoelement; however, it was not influenced, except in some particular situations, by the nature of the hydrolyzed amino acids.

This invention concerns the increase of crop yields of
15 agricultural products, notably those of specifically biological origin since the treatment is of organic origin and non-polluting because of the low concentration required (less than one molecule per hectare) of butyric and caprylic lipo-amino acids and their copper and zinc salts.

20 The invention extends equally to the protection of crops or leaves against viruses (such as tobacco mosaic), microorganisms (with the use of copper salts of the caprylic amino acids, as

well as the protection of the crops in question against potentially destructive animals through the use of zinc salts of the butyric-amino acids) in which case only 3 to 5 g. of active product is required for the protection of 100-150 kg. of crops.

CLAIMS

1. Compounds designed to increase crop yields of agricultural products, to the protection of crops and plants against viruses and microorganisms, as well as against destructive animals, characterized by the presence of certain compounds of lipo-amino acids, salified or non-salified by oligoelements in which activity is linked to hydrosolubility, as well as the need for only minimal doses per hectare.

2. Compounds which, according to Claim 1, are characterized by a preference for chains of fatty acids with four (4) to eight (8) atoms of carbon, specifically the butyric and caprylic chains, acylated to the amino acids derived from hydrolysates of animal proteins, including those derived from fish, as well as vegetable-based ones.

3. Compounds which, according to Claims 1 and 2, are further characterized by the fact that the acylated butyric and caprylic fatty acid chains can be salified or not by oligoelements such as copper or zinc.

4. Compounds made according to the parameters laid out in Claims 1, 2 and 3, in which the zinc salts of butyric-amino acids administered in very small doses serve to repel animals

classically harmful to crops.

5. Compounds made according to the parameters laid out in Claims 1, 2 and 3, in which the use of zinc salts of butyric-amino acids permits a significant increase in crop germination and root development.

6. Compounds made according to the parameters laid out in Claims 1, 2 and 3, in which the copper salts of caprylic amino acids administered in very small doses serve to protect crops and leaves against viruses such as tobacco mosaic, as well as from microorganisms.

7. Compounds made according to the parameters laid out in Claims 1, 2 and 3, in which the use of copper salts of caprylic amino acids permits a measurable increase in the sugar content of beet and grape crops.

[illegible]

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DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that:

My residence, post office address and citizenship are as stated below,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

COMPOSITIONS FOR IMPROVING CROP PRODUCTION,
THE QUALITY AND PRODUCTION THEREOF

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application Serial No. _____ on _____

☒ was filed as PCT international application No. PCT/FR99/00297 on 11 February 1999

and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

| COUNTRY (if PCT, indicate "PCT") | APPLICATION NUMBER | DATE OF FILING (day, month, year) | PRIORITY CLAIMED UNDER 35 USC 119 |
|-------------------------------------|--------------------|--------------------------------------|---------------------------------------------------------------------|
| France | 98/03723 | 26 March 1998 | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112. I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

| PCT / US APPLICATION NUMBER | PCT / US FILING DATE | PATENTED(✓) | PENDING(✓) | ABANDONED(✓) |
|-----------------------------|----------------------|-------------|------------|--------------|
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